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portant, of course, are those that served as food; for instance, ears of wheat and barley, and agglomerations or lumps of grains of these cereals. Millet was likewise found, but no rye. Even pieces of wheat-bread, in which the grains can be plainly seen, have been preserved. There are small apples cut in halves, hazelnuts, beechnuts, raspberry-seeds, stones of the wild plum, and other eatable productions of the vegetable kingdom. Flax sometimes occurs in fibres already prepared for spinning.

The fauna of that period is represented by a great number of animals, the osseous remains of which Mr. Messikommer obtains in large quantities from the peat. Some of these animals differ from the species now existing. The bones found at Robenhausen are always examined and classified by Professor Rüttimeyer, one of the best osteologists of our time. The pile-work in question belongs to that remote period in which the use of metals was not yet known, and articles of bronze, therefore, are not found at this place. Mr. Messikommer, however, is in constant communication with the archæologists of Switzerland, and is thus enabled to procure by exchange the objects of bronze occurring in the Palattines of later periods. He informed me some time ago that he is now prepared to furnish the typical objects of bronze, such as arrow and spearheads, knives, sickles, fish-hooks, ornaments, etc. His prices, of course, vary according to the character and condition of the specimens; but I can state from personal experience that they are low, considering the great labor and time it requires to obtain these remarkable tokens of the past. Mr. Messikommer is a gentleman of well established character, and the objects offered by him may be relied upon as being perfectly genuine. I will with pleasure give more detailed information to collectors who wish to enter into communication with Mr. Messikommer. — CHARLES RAU, *New York, February, 1873.*

MICROSCOPY.

SECTIONS OF THE ORGANS OF HEARING. — The following hints, abstracted from the papers of Mr. H. N. Moseley and Dr. U. Pritchard in the "Quarterly Journal of Microscopical Science," will be of use to beginners, not only in preparing the organ referred to, but in dealing with many cases involving some of the same difficulties. A guinea-pig is the most desirable subject, though the cat, dog, rabbit, rat, or other animals may be used. The ani-

mal is killed, the head removed, the lower jaw disarticulated, and the two tympanic bullæ exposed. One of these is opened and the cochlea, projecting into its cavity, removed and immersed in a half per cent. solution of chromic acid in water. The acid should be changed twice a week, and in about two weeks the soft tissues will be sufficiently hardened, and the bony parts may be softened enough for slicing with a razor. If not, one two-hundredth part of nitric or muriatic acid is to be added to the solution, and in from one day to three weeks, according to the hardness of the bone, the sections can be made. To support the internal parts while cutting, the cavity must be filled up. For this purpose inject the cavity with a hot solution of gelatine; or immerse it in a mixture of wax and cocoa butter melted together, and exhaust the air under a receiver of an air pump so that the melted wax can run in; or soak it, for an hour or two, in a thick solution of gum arabic contained in a paper bag, and then put the bag in absolute alcohol for a day or two when the water will be sufficiently extracted to leave the gum in a tough state (methylated spirit may be substituted for the absolute alcohol). The whole organ thus prepared is to be imbedded in the mixture of wax and cocoa butter,—or wax and sweet oil,—or lard one part, spermaceti two parts, and paraffine five parts, melted together over a water bath,—and sections cut with a very sharp razor. The sections are to be floated off, stained with carmine, and mounted in glycerine or in acetate of potash (acetate of potash two ounces, hot water one ounce, dissolve and cool; add spirits of camphor thirty drops, and filter); or transferred through water, absolute alcohol, and oil of cloves to dammar varnish or Canada balsam.

PROBABLE NATURE OF THE NERVE CURRENT.—Dr. L. S. Beale discusses this question in the “Monthly Microscopical Journal,” and furnishes some very interesting speculations which are especially valuable from the author’s eminent familiarity with the subject.

The active part of the nerve fibre distributed to the peripheral organ which receives the impressions is described as consisting invariably of a pale, very transparent, faintly granular, but in the natural state perfectly invisible cord. Between this and the central origin, in man and the higher animals, intervenes a more or less extended system of nerve cords through which impressions

pass with great rapidity. The part of these nerve cords capable of transmitting nervous impressions is generally conceded to be the axis cylinder, a thin, thread-like cord of extremely simple structure, never resembling the terminal network, and always surrounded by the medullary sheath, a white, fatty, albuminous substance of at least ten times its diameter, which seems calculated to insulate and protect it. This medullary sheath, or white substance of Schwann, is also little permeable to aqueous or albuminous solutions, and would preserve a uniform degree of moisture in the axis cylinder. The axis cylinder seems almost like an elongated band of white fibrous tissue. But little structural peculiarity has been demonstrated in it, and it is probably most remarkable for the perfect continuity of its parallel strata. The author believes that whatever changes take place in it might occur in other forms of tissue; indeed that such changes do occur in all tissues, but that only here are they so insulated that their variations become evident. If the axis cylinder could be replaced by a long filament of ordinary fibrous tissue, he would feel almost justified in expecting the nerve current to be as well conducted as by the axis cylinder itself.

That the nerve current is some unknown form of energy, different from heat, electricity, etc., but correlated with them, is mentioned as the prevalent belief of physiologists. It is deemed unphilosophical to explain phenomena by some conjectural force rather than by those we know something about; and the excellent opportunity for the author's favorite tilt at the physicists is taken advantage of with undisguised enthusiasm.

The chemical theory of the nerve current is still less admissible. The axis cylinder is a firm, tough, fibrous-like band, evidently of slow growth, little prone to rapid change, and only in imagination capable of rapid disintegration and reconstruction. Its action cannot be performed by chemical decomposition of its particles, especially as it is surrounded by ten times its thickness of myelin (medullary sheath) one of the least permeable substances in the body, and one of the least suitable media through which to take up new material or get rid of products of decay.

The vibratory theory is equally inconsistent with the structure of the axis cylinder, which is not well calculated to propagate motor impulses and which varies greatly in different parts of its course. The thickness of the medullary sheath, and its greater

development where nerves run parallel to one another are mentioned by the author as incompatible with this theory; though it is not inconceivable that such insulation should be as essential to other vibrations as to electrical movements.

That nerve fibre is a peculiarly vital form of tissue, pervaded by some exceptional form of force nowhere else present, seems entirely to want confirmation.

That the nerve current is ordinary electricity, transmitted through the beautifully insulated axis cylinder, though not proved, is considered more than probable, notwithstanding the somewhat incongruous result obtained by rough experiments, such as transmitting more powerful currents through mutilated nerves, or through nerves and other tissues after the post mortem changes, or at a rate slower than through copper wire, no allowance being made for the less perfect conducting power of a moist fibrous cord. No one has disproved the electrical character of the nerve current, while such character is strongly supported by a multitude of well determined facts, especially those connected with the electrical organs of some of the lower animals, where electricity is set free in special organs rich in nerves but not essentially different from other nerve organs.

How the course of the electrical current is directed and varied, and how subjected to the control of the will, are independent questions not yet answered.

INSECTS' FEET AS CARRIERS OF DIRT. — Prof. W. Kletzinsky, of Vienna, has detected with the microscope an abundance of foreign particles in pure glycerine into which flies had stepped and from which they had succeeded in freeing themselves; thus vindicating the belief that flies may become carriers of contagious diseases.

CIRCULATION IN INSECTS. — Mr. R. King read an interesting paper on this subject at the Dubuque meeting of the American Association. By a microscopical study of insects during periods of dormancy or hibernation, some forms of larvæ, especially, being so transparent that the microscope gains a perfect view of their internal organs without interfering with them, he is satisfied that there is no circulation while the insect is at absolute rest, and that the ordinary circulation in insects is entirely the result of the voluntary muscular activity of the creatures.

THE WHITE BLOOD-CORPUSCLES A CONNECTING LINK. — The “closing address” before the Oldham Microscopical Society, by its retiring President, Mr. James Nield, alludes to the white corpuscles of human blood, their chemical composition, their ever changing form, their use in the economy of the body, and their nearly complete identity in form and chemical composition with the corresponding corpuscles in the blood of all the other vertebrate animals. He admits the conviction that these peculiar bodies are links connecting the humble rhizopods with the highest animals, in the former case floating in water and in the latter drifting in the plasma of the blood. He considers the naked amæba and the sarcode of the foraminiferous shell only free members of a family which are aggregated and communistic in the higher creatures from the sponge to man.

MARKINGS OF BATTLEDOOR SCALES. — Mr. T. W. Wonfer assured the Brighton and Sussex Natural History Society that while examining these scales with reference to Dr. Anthony’s idea that the markings were tubercles on the ribs, he succeeded in obtaining a view of some scales standing on edge, in which cases he could see the tubercles standing out distinctly from the ribs. The scales should be examined from freshly killed insects, as they tend to become flattened in drying.

STRUCTURE OF INFUSORIA. — Prof. Edward Van Beneden questions the pleuricellular nature of the Infusoria. The belief that they were unicellular beings was generally abandoned as soon as their complex nature became known; but he has found the Gregarinæ, monocellular organisms, to attain a high degree of complication, and he conceives that the same may be true of the Infusoria.

THE GONIOMETER STAGE. — The glass sliding-stage, moving upon a circular plate having concentric and graduated rotation, has become, and is still more becoming, so important a contrivance in microscopy that its origin is a question of some importance. This stage seems to be known in Europe as Nachet’s invention, and it was doubtless from his new style of Students’ Microscope that it was adopted by the London makers. Mr. Joseph Zentmayer of Philadelphia, who had made the plain glass stage long before that time, constructed in the spring of 1859, for a Mr. Roosevelt of New York, a revolving glass stage which would be

minutely and quite accurately represented by Dr. Carpenter's description (*The Microscope*, London, 1868, pp. 68 and 69). He continued to make these stages, and in the year 1864 furnished one to Prof. Edwin Emerson, then of Paris, who took pains to show the American stand to those interested in microscopes and especially to the makers. In October of the same year Mr. (now Dr.) W. W. Keen of Philadelphia exhibited one of these stands, with a similar stage, to Nachet, and the following spring placed it in his hands for safe packing for return to this country. These goniometer stages were certainly substantially the same as those now made, and were probably equal to any of the latter in delicacy of adjustment and finish; and it would seem that the publicity then given to them should guarantee to their maker the credit for their invention, unless some other person should claim to have arranged, and in some way published, an identical contrivance at an earlier date.

NOTES.

IN the construction of new cases for the birds in the museum of the Boston Society of Natural History, we learn from the report of the custodian, Prof. Hyatt, "that extraordinary precautions were taken in order to render these cases absolutely insect-tight. The lumber was very carefully selected and kept heated while the work was going on, all joints were tongued, grooved and glued. The tops, bottoms and sides, were built into the plastering, the sashes grooved and tongued and locked by wedge-shaped bolts. The latter were invented in order to draw the sashes up tightly and firmly against the tongues at the top and bottom, and completely close the fronts of each case. Morse's patent brackets were used to suspend the shelving, which hangs upon the wall, and has no connection with the fronts. The success of these precautions is shown by the air-tight condition of the cases. By suddenly opening or closing a sash, one could readily crush in, or burst out, the neighboring glass panes. The resistance of the air is so great that it has to be overcome by a steady slow pressure as if one was working the handle of a piston. With the exception of the method of bolting, and some other details, this plan is similar to that which has been successfully adopted by the Smithsonian Institution for the preservation of their valuable collection of birds, and was recommended to us by Professor Baird.